

Appendix H

Report: Strategic searches for Florida bonneted bat (*Eumops floridanus*) roosts in
Big Cypress National Preserve (BCNP) (March 19, 2019)

Project title: Strategic searches for Florida bonneted bat (*Eumops floridanus*) roosts in Big Cypress National Preserve (BCNP)

March 19, 2019

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Executive Summary:

From October 2016 to September 2017 Bat Conservation International (BCI) and Big Cypress National Preserve (BCNP) worked in partnership to search for Florida bonneted bat (FBB) roosts in Big Cypress National Preserve (BCNP). During this project period 2,449 calls of FBBs were detected in five areas under surveillance. No roosts were detected by our team during this project period.

Project Location:

The location of this project is the National Park Service's (NPS) Big Cypress National Preserve in Collier, Monroe, and Miami-Dade Counties in southwest Florida. Activities were focused upon Raccoon Point and Annette's Pond near Austin's old campsite, but other important areas of interest were surveyed, including Deep Lake, Bass Lake, and Buckskin Trail.

Methods:

We used available geospatial and acoustic data collected by BCNP prior to the onset of this project to determine potential locations for targeted searches and acoustic monitoring efforts. We focused on hot spots of known acoustic activity and areas with existing red-cockaded woodpecker activity to increase the likelihood of identifying tree roosts. We deployed a grid of acoustic detectors across the landscape to survey for the ultrasonic calls of emerging and travelling bats. When bat calls were identified shortly after sunset or just prior to sunrise, the detector grids were adjusted to focus surveillance on those key locations. We had hoped this technique would allow us to isolate potential cavity trees and/or other potential roost sites for visual inspection of cavities or observations to detect emergence.

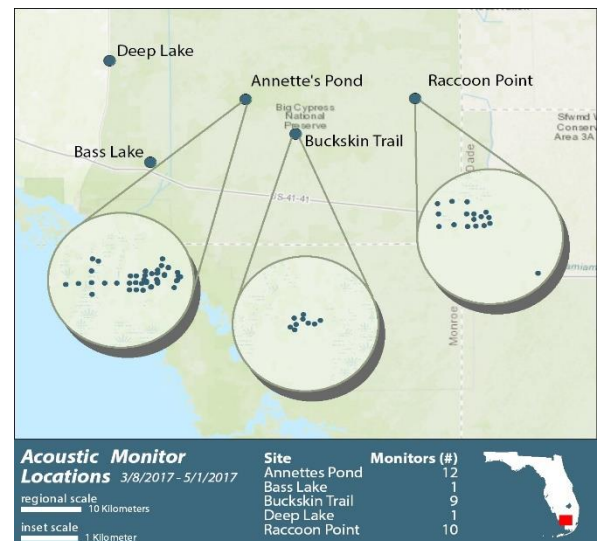


Fig. 1 Overview of survey effort in Big Cypress National Preserve. Image is also available full size in Appendix A.

Bat detector units were individually identified, and we documented detector placement location using UTM's. We determined how to adjust the acoustic grid to isolate roost trees by using sunset time, time of first FBB call, time of sunset and total number of FBB calls. Other data collected during detector deployment included total number of calls reviewed, temperature at sunset, wind, precipitation, total files collected, and days deployed for each unit. A detailed description of detector deployment can be found in Appendix C in a narrative of work provided by the technicians conducting the field activities.

Results:

We deployed bat detectors for 35 nights in BCNP between March 22 and May 1, 2017. Collectively we recorded 48,808 acoustic recordings, 7,462 of which were auto-classified to FBBs. We manually vetted the auto-classified calls and were able to confirm 2,449 as FBB calls. The table below provides a summary of calls reviewed and confirmed by BCNP area during the season (Table 1). A visual representation of the confirmed calls can also be seen below in Figure 2 (and Appendix B) and supplemental material provided as an animation file (Bat_Calls_Animation.mp4). Full datasets from each detector deployment can be found in Appendix D and in the supplemental materials provided as an EXCEL document (Acoustic Call Data BCNP 2017.xls).

Although this method of deploying bat detectors was able to identify areas of high activity for FBBs, we did not discover any bat roosts as a result of the effort.

Table 1. Summary of FBB calls reviewed and confirmed at BCNP between March 22-May 1, 2017

Annette's Pond		
	# calls reviewed	2339
	# FBB calls	1018
Raccoon Point		
	# calls reviewed	4649
	# FBB calls	1326
Buckskin Trail		
	# calls reviewed	206
	# FBB calls	79
Deep Lake		
	# calls reviewed	187
	# FBB calls	20
Bass Lake		
	# calls reviewed	81
	# FBB calls	6
TOTAL CALLS		

calls reviewed is the number calls autoclassified as FBB calls and manually vetted.

FBB calls is the number of calls confirmed by manual vetting as positive for FBB

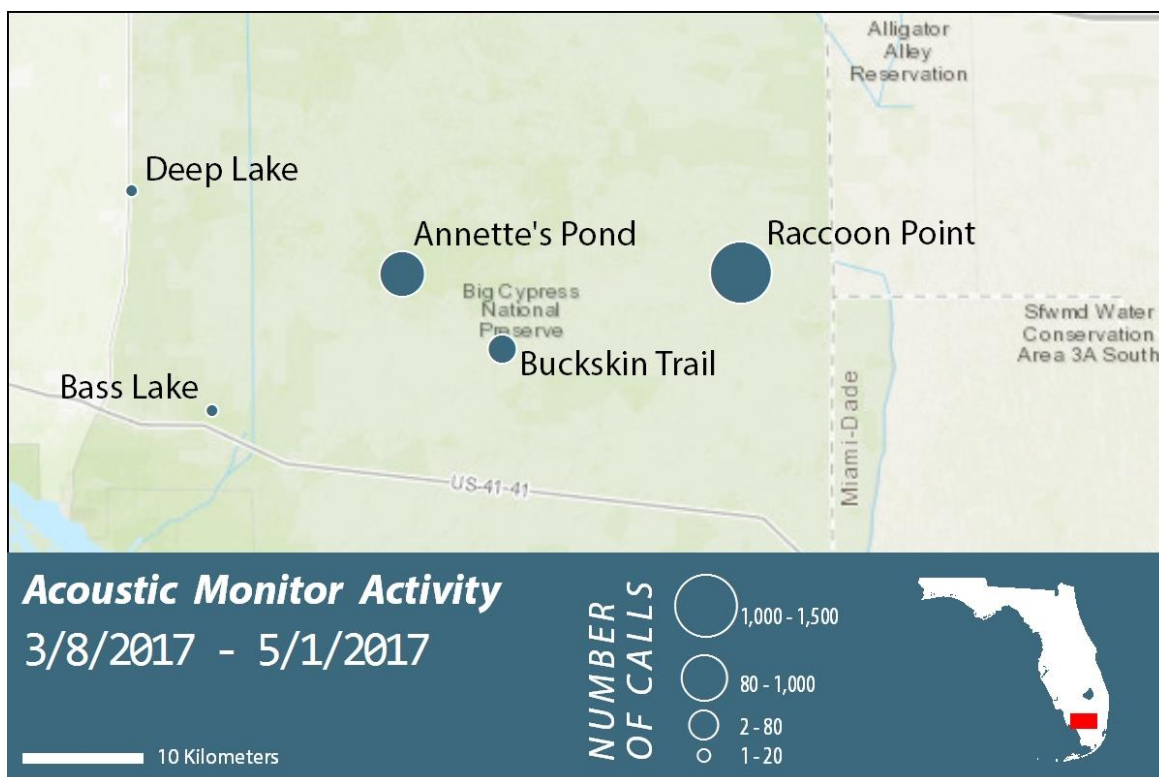


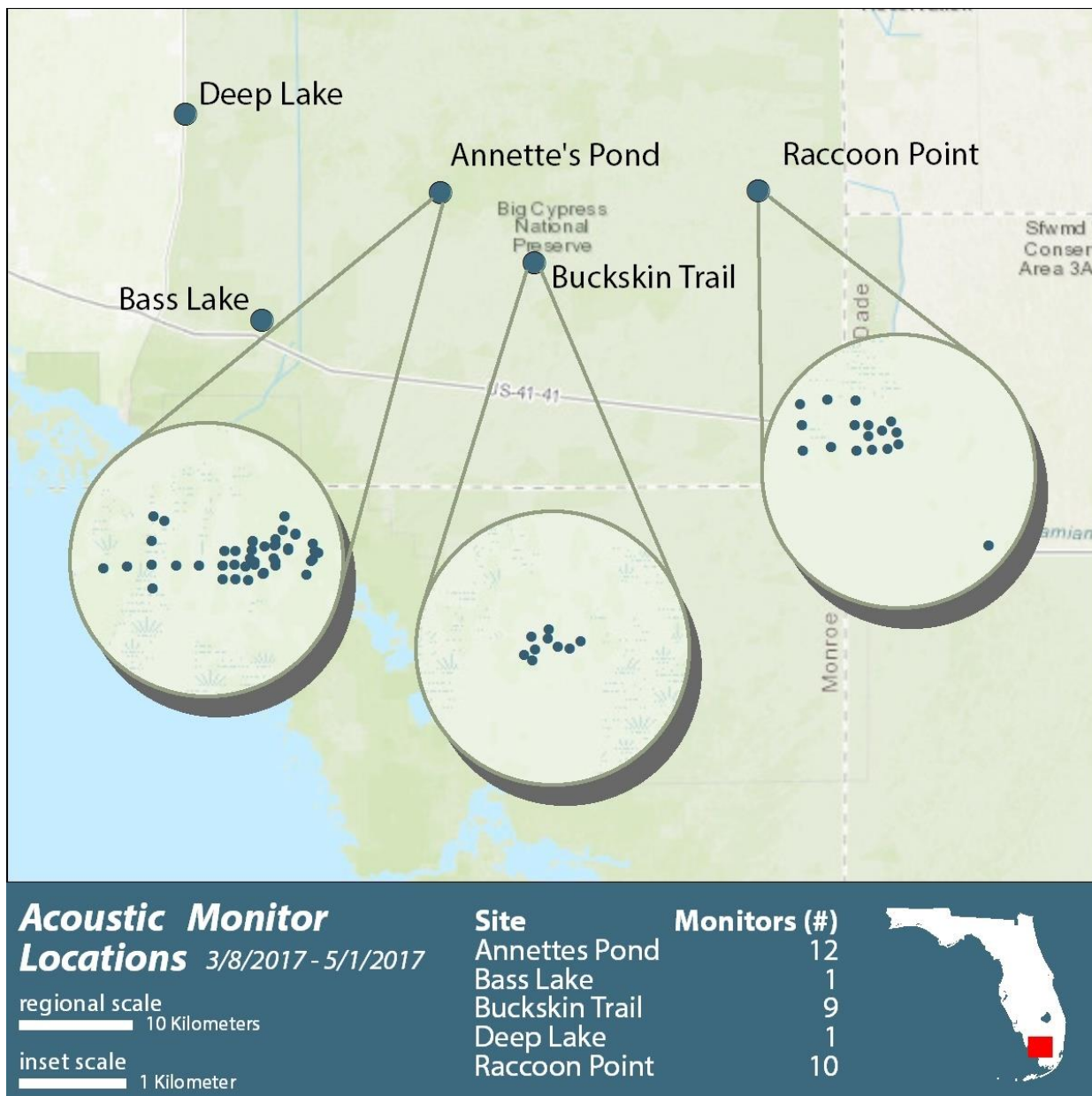
Fig. 2. Frequency of Florida Bonneted Bat calls detected at different survey sites across Big Cypress National Preserve.

Partners/Collaborators:

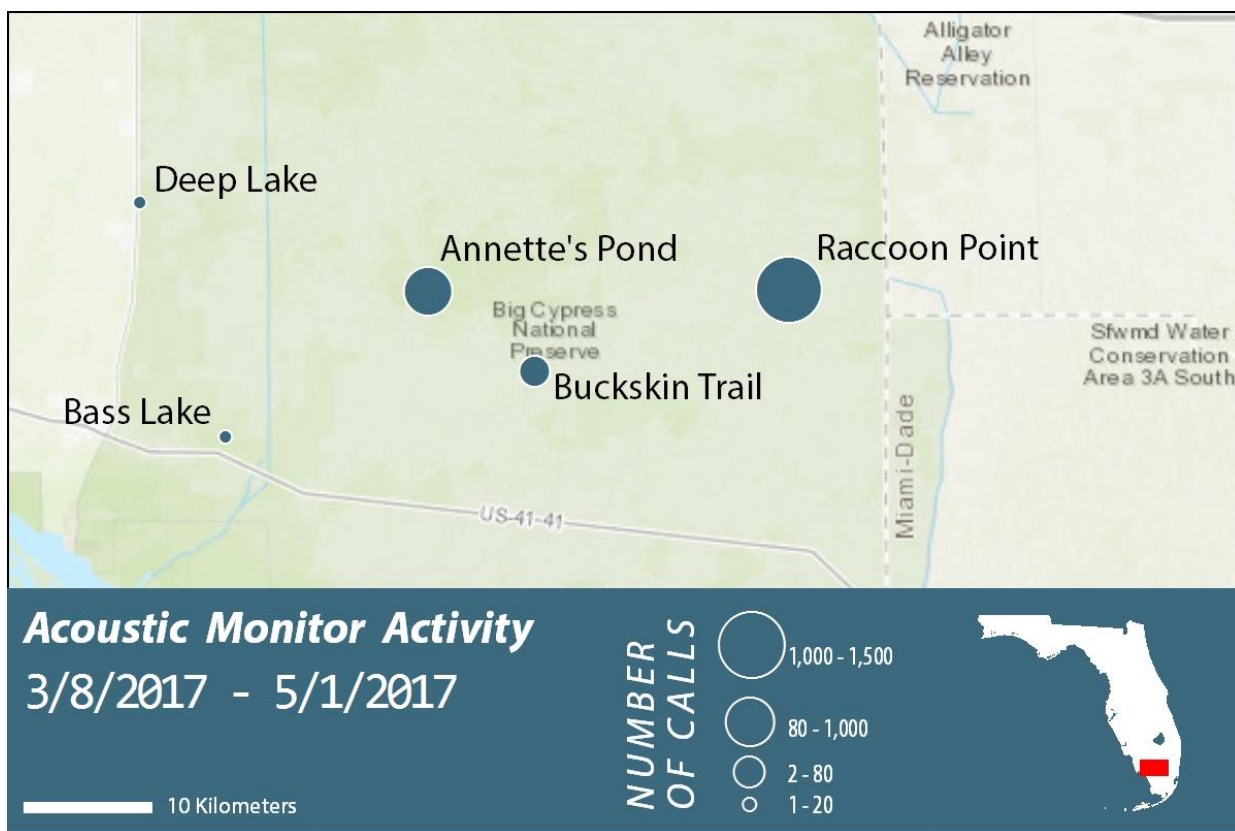
NPS/BCNP provided housing, vehicle, equipment (e.g., visual inspection camera systems, acoustic detectors), and logistical support for this project. NPS/BCNP provided day-to-day support for on-the-ground field staff, as needed. Bat Conservation International (BCI) hired temporary staff for field activities and provided BCI staff to assist with project initiation.

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APPENDIX A. Overview of survey effort to locate roost trees using acoustic detectors at Big Cypress National Preserve.



APPENDIX B. Frequency of Florida Bonneted Bat calls detected at different survey sites across Big Cypress National Preserve.



APPENDIX C. Detailed narrative summary of detector deployment provided by technicians conducting field work at Big Cypress National Preserve.

Provided by Janie and Robert Hinson (May 02, 2017)

Our first day consisted of orientation where we not only discussed the BCI way of pay and communication but also where we were going to put the monitors, in what formations, and how we were going to organize all of this data. We expanded the Excel program we had been using at BICY, to organize our data, using the following columns that were updated every time the SD cards were replaced. The columns were labeled as: Area the place we were working, primarily Annette's Pond (AP) but because of the fire we also set monitors at different locations noted in the Excel program. Unit refers to the acoustic monitor's name. There were ten monitors so we named them Alpha, Bravo, Charlie, Delta, Echo, Fox Trot, Gulf, Hotel, India and Juliet. These names would remain constant throughout the study. Quadrant, Easting and Northing refer to the UTM location. The GPS Point Name is the first letter of the name of the monitor and the date the monitors were set out at this location and are on the maps. Date lists the days the monitor was at this location so A-308 means the monitor was set out at this UTM on March 8, 2017 and would stay at that location until March 12, 2017 according to the Excel Program. We also have Sunset, Time of first Eumops Call, Time after Sunset, and Total Number of Eumops Calls; these values were used to decide the direction to move the monitors. The consensus is that the earlier the calls after sunset the closer one was to the nursery roost tree; the total number of calls would be the tie-breaker. For statics we had columns for Total Number Calls Reviewed, Eumops File Names, Style of Unit, Temperature at Sunset, Wind, Rain, Total Files Collected, and Days Deployed for the collection period. The Excel Program updates and maps were emailed to Katie Gilles, Deborah Jansen, Ralph Arwood, Annette Johnson, and Liz for comments and suggestions after the data from the SD cards was analyzed.

To start the study we collected the acoustic monitors from their various locations in the field and got them ready to set out at Annette's Pond (AP). The first formation was a cross (see map AP 3-08) we went back and collected the SD cards after two days as was agreed. We left the monitors in the location until we decided where to move them and again removed SD cards and added the analyzed data to the Excel program. As agreed the decision on which direction to move the monitors was made by looking at the shortest time after sunset and the most calls. For this presentation I have printed out the part of the Excel program with just that information. We decided to move the monitors in the direction of the Alpha monitor (A-308) which had the earliest time of thirty-nine minutes after sunset and a two day total of seven calls. Echo had a forty-two minute call but only a total of five calls. India also had early calls but that was after we had already moved the monitors and it was very near the pond.

The 308 monitors had been two hundred meters apart. In the fear that we had missed some calls we put the next monitors one hundred meters apart, in a nine monitor grid. We moved the monitors on March 13, 2017 so they are called 313. Look at the next map and Excel printout. This is still not an area normally considered bat habitat. There are not open pine areas; there are no potential trees with cavities that would be accessible to these large, fast, high flying bats that do not maneuver well in close quarters. But we were getting close. From the maps we can see the prairies not far away.

We decided to move our entire operation east and walk west towards the AP area. On the twentieth (320) we once again moved the monitors this time placing them near trees with cavities and around the prairies and cypress domes and strands. These locations produced some varied recording times we may have been getting near a roost tree but the unusually cold nights may have been confusing us. We were hoping for some consistently warm nights so we could tell. Then the fire started. We took the monitors out of the field on March 23, 2017 and could not put them back in until April 9, 2017. We will talk about the other locations we visited after we finish with the AP.

On April 9, 2017 we put out monitors (409) near many of the places we had had them on the twentieth and the thirteenth of March, all the time looking for trees with cavities. In all we have tagged ten trees in this area. Some have the large cavity holes of Pileated Woodpeckers. One even has had an adult Pileated Woodpecker in and out of the cavity. Others have the smaller cavity holes of smaller woodpeckers such as Flickers and Red-bellies. This is not an area of documented RCW roost trees.

On April 13, 2017 we moved four of the monitors B-409, D-409, E-409 and F-409 became B-413, D-413, E-413, and F-413; the rest of the monitors were left at the 409 locations. We were collecting data but it did not seem to be pointing us in any one direction. We removed all of the monitors. We visited Webb-Babcock and talked to people. There is so little information known about these bats nobody really knows what all this data means. It was agreed that we may have been recording single bats staying in a cavity for a night or so but that the main Nursery roost must be somewhere close. We returned to AP invigorated.

We spent one day just looking for roost trees and this time when we put the monitors out on April 25, 2017 we put them near a cavity tree. I-425 was near T-855, H-425 near T-806, C-425 near T-890 and D-425 near T-919. B-525 was in an area of several possible trees but none tagged.

On May 1, 2017 we decided to sit out and listen and watch. Bob, Deb Jansen, and I sat near three different trees. I sat near T-917 and brought a monitor with me. Bob sat under a new found palm tree and watched Great Crested Flycatchers go in for the evening, no bats. Deb sat near the tree T-890, no bats. I didn't see any bats but my monitor recorded Eufi five times from 8:38 until we left at 9 pm, sunset was at 7:54. Liz is planning to come and listen. During the fire break we put the monitors up in several other locations two were around easily accessible ponds that seem to have water even in the dry season. One was at Bass Lake which is a gated area that Reserve visitors are not allowed to enter. The other was near the Fire offices called Deep Lake. Neither gave good early call times but we did record bats visiting these areas on the two nights we had the recorders out. We also sat in the car out one evening to see if we could see bats emerging from a couple of Royal Palms that would be difficult to set up monitors near. We didn't see anything which doesn't mean much but we thought we would give it a try.

Because we had placed two of the monitors out and wanted to leave them at least two nights we only had eight monitors to take to Raccoon Point where the other roost had been observed. We know they had been at this roost at one time we also know they had left. We wanted to see if we could find their other roost tree if there was one. We put the monitors out on April 28, 2017 around the Roost Tree but never closer than two hundred meters. On the thirtieth we moved them based on the way we had always interpreted it, earliest time most calls. That meant we moved them towards the A and F monitors. On the thirtieth we also set out C-430 ten meters from the Roost tree. The first night 4-28 we got a total of forty-eight calls from eight with the most recordings for one monitor of twenty-four. The next night the same eight monitors recorded thirty-six times with the most of one monitor being ten. When we added a ninth monitor ten meters from the Roost Tree, the original eight made a total of seventy-one recordings while the one monitor near the Roost Tree had eighty-nine. That one monitor had more recordings than the other eight just two hundred meters away. Either we are missing many calls or bats go in so many directions or stay close to the Roost Tree that the numbers just don't mean anything two hundred meters away. Hunting for the bat roosts is slow work if you move thru an area too quickly you may miss something. This was also shown in the times of the first emergence. They ranged from eighteen minutes to one hour and eleven minutes after sunset.

We also put the monitors out on Buckskin Trail near where bats had been heard the previous summer. We had some good early times but no great concentrations for the three nights we had the monitors out.

Some of the things we have learned.

1. The monitors must be set out at least ten meters from a cavity tree and at least one hundred meters from another monitor.
2. The only way to know if there is a roost tree is to sit out at emergence time either listen or photograph the bats. There are only going to be a few bats and will not all come out at once. You can't really tell unless there is someone who can hear bats well enough to tell where they are coming from and going to or can see or photograph them come out of the roost.
3. Systematic searching: I personally don't think this method helps much more than a good map. We knew they were coming to Annette's Pond. We were also pretty sure they weren't roosting there. A good map would have showed us the area we ended up in only a short distance away. There is also an interesting area north of Annette's Pond that we never got to go investigate.

APPENDIX D. Summary of Florida Bonneted Bat Calls Detected During Acoustic Monitoring to Identify Roosting Sites at Big Cypress National Preserve Between March 8 – May 1, 2017.

SUMMARY OF FLORIDA BONNETED BAT CALLS DETECTED DURING ACOUSTIC MONITORING TO IDENTIFY ROOSTING SITES AT BIG CYPRESS NATIONAL PRESERVE

	3/8/2017	3/9/2017	3/10/2017	3/11/2017	3/12/2017	3/13/2017	3/14/2017	3/15/2017	3/16/2017	3/17/2017	3/20/2017	3/21/2017
Annette's Pond												
# calls reviewed	146	174	132	119	98	248	47	27	4	0	63	518
# FBB calls	8	16	40	51	67	163	23	18	1	0	17	24
Raccoon Point												
# calls reviewed												
# FBB calls												
Buckskin Trail												
# calls reviewed												
# FBB calls												
Deep Lake												
# calls reviewed												
# FBB calls												
Bass Lake												
# calls reviewed												
# FBB calls												
	3/22/2017	3/27/2017	3/28/2017	3/29/2017	3/30/2017	3/31/2017	4/1/2017	4/2/2017	4/3/2017	4/9/2017	4/10/2017	4/11/2017
Annette's Pond												
# calls reviewed	109									22	53	135
# FBB calls	44									17	49	128
Raccoon Point												
# calls reviewed			279	1207	439	373	371	683	1297			
# FBB calls			48	36	159	146	95	151	691			
Buckskin Trail												
# calls reviewed												
# FBB calls												
Deep Lake												
# calls reviewed		63	124									
# FBB calls		15	5									
Bass Lake												
# calls reviewed		21	60									
# FBB calls		2	4									

	4/12/2017	4/13/2017	4/14/2017	4/15/2017	4/18/2017	4/19/2017	4/20/2017	4/25/2017	4/26/2017	4/27/2017	5/1/2017
Annette's Pond											
# calls reviewed	47	26	90	52				45	131	48	5
# FBB calls	41	22	83	42				29	98	32	5
Raccoon Point											
# calls reviewed											
# FBB calls											
Buckskin Trail											
# calls reviewed					80	62	64				
# FBB calls					38	21	20				
Deep Lake											
# calls reviewed											
# FBB calls											
Bass Lake											
# calls reviewed											
# FBB calls											